

REMARKS

Claims 1-26 are pending.

In the Office Action, the Examiner rejected claims 1-26 under 35 U.S.C. Section 112, second paragraph, as being indefinite and rejected claims 1-8 and 26 under 35 U.S.C. Section 112, second paragraph, as being incomplete. Specifically, the Examiner asks when a tuning occurs in relation with the changing of the optical cavity length. Tuning occurs during the change of the cavity length. Claim 1 has been amended accordingly. Numerous changes were also made purely as a matter of form to address the Examiner's indefiniteness rejection.

The Examiner rejected claims 9-25 under 35 U.S.C. Section 112, second paragraph, as being incomplete. Specifically, the Examiner stated that there are 3 places where the cooperative relationship is missing: 1) between the laser diode and laser crystal; 2) between the laser crystal and actuator; and 3) between the actuator and etalon.

With respect to his first rejection, Applicant has amended claim 9 so that the laser diode is positioned to receive the pump light from the laser crystal. With respect to his second and third rejections, claim 9 has been amended to recite that the actuator is "positioned to vary" the length of the cavity in which the laser crystal is disposed. Also, the phrase "followed by", which has been objected to by the Examiner, has been removed solely to accommodate the Examiner's concern of indefiniteness. Applicant submits that the cooperative relationship of all elements is now clear.

The Examiner rejected claims 1-13, 20 and 26 under 35 U.S.C. Section 102(b) as being anticipated by Sugiyama (US Patent No. 5701320). Applicant respectfully traverses the rejection.

While Sugiyama uses piezo and etalon, his aim is entirely different. Sugiyama teaches and is interested only in stabilizing the laser frequency, not "tuning" as recited in claim 1. By contrast, the present invention concerns achieving the greatest possible tuning range. In order to ensure SLM operation, Sugiyama varies the gas pressure and, therefore, the index of refraction. By contrast, the present invention optimizes the position of the frequency-selective element etalon and cavity length relative to one another and compensates for nonlinearities in the control, etc. during tuning.

At Col. 7, lines 1-9, Sugiyama measures pressure and temperature for regulating. By contrast, the present invention measures only the output power (performance curves), and the

absolute frequency, which is decisive for Sugiyama, is unimportant for the present invention. Sugiyama can vary the laser frequency while maintaining SLM operation using etalon by changing cavity length and pressure. However, achieving the most extensive continuous tuning range is not the goal for Sugiyama. For example, the frequency can be changed with any dye laser by changing the etalon and cavity length, but this cannot be carried out continuously over the whole amplification range as claimed in claim 1.

At Col. 4, lines 20-43, "performance" or "tuning function" in Sugiyama relates directly to the frequency response. However, the present invention measures output power and does not derive absolute frequency from this, but rather an optimal position of the elements relative to one another with respect to the output, which then leads to an extensive continuous SLM tuning range. Claim 1 has been amended as "the performances curves indicating the output power of the laser" to make clear that the performance curves refer to output power curves.

At Col. 4, lines 20ff., suppression of side modes as claimed in claim 1 is never addressed at all in Sugiyama.

In sum, Sugiyama is only interested in stabilization and it does not aim at an extensive tuning range. While Sugiyama may contain some of the same frequency-selective elements, he uses them for a completely different purpose.

The Examiner rejected claims 1-9 and 26 under 35 U.S.C. Section 102(b) as being anticipated by Wakata (US Patent 5,130,998). Applicant respectfully traverses the rejection.

Similar to Sugiyama, Wakata is also only interested in wavelength stabilization and achieving SLM operation and a local operating point.

The frequency-selective element (interference fringe detector 9), not the output power, is initially used for detection. In contrast to Wakata and Sugiyama, the present invention as claimed in claim 1 measures the output power (performance curves) of the laser while varying the different frequency-selective elements in the laser over the entire amplification range in order to maintain the largest possible SLM tuning range. Wakata sees a relationship between the output power and the frequency drift in the context of thermal deformation of his etalon and wants to compensate this. This is an extremely local process with respect to the frequency range.

Wakata also uses the output power of the laser to optimize the adjustment of his etalon. However, he does this only locally according to a known method which is also applied in many other laser systems: the etalon is moved back and forth, an output modulation results

from this and the etalon is adjusted to a maximum. This also takes place locally and does not require a **learning curve** “which is derived from the performance curves”. Hystereses or other nonlinearities cannot be detected in this way. In particular, it can also not be detected in case the maximum is not precisely the most favorable for an optimized adjustment. A large tuning range particularly for fast tuning processes cannot be achieved in this way.

The Examiner rejected claims 9-14, 16, 20, 23 and 24 under 35 U.S.C. Section 102(e) as being anticipated by Zorabedian (US Patent No. 6,108,355). Applicant respectfully traverses the rejection.

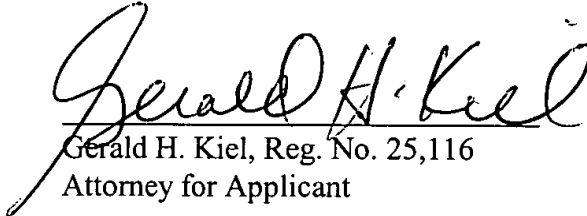
In Zorabedian, the tuning of the laser is achieved in a completely different way from the present invention. First, there is no calibration of the individual elements by recording output (performance curves). Second, a change in the cavity length is not provided in Zorabedian, since he displaces a wedge-shaped element in the cavity vertical to the optical axis and achieves a continuous tuning in this way.

Each of the patents cited aims in a different direction (Sugiyama, Wakata) or achieves an extensive tuning range in a completely different manner (Zorabedian). None of the patents carry out tuning curves of the frequency-selective elements over the entire amplification range in order to achieve an optimal adjustment. Compensation of nonlinearities and hystereses of individual adjusting elements is not considered and is also not necessary in these patents.

The Examiner also rejected claims 14-19 and 21-25 under 35 U.S.C. Section 103 as being obvious over Sugiyama. Applicant submits that those claims are patentable by virtue of their dependency from independent parent claims.

Based upon the above amendments and remarks, Applicant respectfully requests reconsideration of this application and its earlier allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,


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